See Exploding Colors in the Magic Milk Experiment

See exploding bursts of color in the amazing **magic milk experiment!** We'll show you some two ways to do the experiment and an extension idea for the project as well.

magic milk
classic science experiment
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When you add a little bit of dish soap to milk and food coloring, the colors swirl around to form what I would deem very artistic and abstract paintings! For the science behind it scroll to the end of this post.

The magic milk science experiment is a simple science experiment you can do with everyday materials. I love showing kids how to do chemistry experiments using simple household supplies.

We did this project in our after school classes and when our students asked to "take it home" I told them they could easily recreate it in their own kitchen.

Detailed Instructions for the Magic Milk Experiment Watch the video

How to do the Magic Milk Experiment

Magic Milk Experiment Materials

- Almond Milk or Cow's Milk
- Dish soap
- Q-tips (Cotton Swab)
- Cotton Balls
- Food coloring
- Shallow plate or wide bowls

Magic Milk Instructions: Method #1

- Fill a plate or bowl with milk

- Drop in at least 2 drops of each of four colors of food coloring. The more variety of colors the cooler the painting.

- Generously dip the end of a q-tip in dish soap.
- Now dip the q-tip (cotton swab) into the milk next to a drop of color.
- The first thing that will happen is the color will burst as soon as the dish soap hits it. It’s a great effect but very short lived. Once there

is a little dishsoap in the milk it no longer “bursts”.

- Gently swirl the q-tip through the different colors and you'll see little rivers of color start to form.

- Continue until the colors begin to mix and become brown. Empty your plate/bowl and repeat.

Magic Milk Experiment Instructions: Method #2

Time needed: 10 minutes.

This version of the magic milk experiment lasts a long time, provided kids can restrain themselves from moving the cotton ball!

1. **Add milk to plate**

Pour a thin layer of milk in a plate or bowl.

2. **Add food coloring**

Add a few drops each of food coloring on the center of the plate.

3. **Soak cotton ball**

Soak a cotton ball in dish soap.

4. **Place cotton ball in milk**

Carefully place the cotton ball in the center. The colors will explode out of the center!

5. **Let the reaction continue**

Let the reaction continue until the colors begin to mix and become brown.

Tips & More

- You don’t need that much milk! I vastly overestimated how much we would need. For a class of 25 kids we used 1 1/2 gallons of milk.
- This is a great use of expired milk products. Put that small amount of whipping cream at the back of your refrigerator to use.
- Kids love the magic aspect of this project. We called the cotton swabs “magic wands.”
- Too much swishing and swirling and you’ll end up with brown muck fast. Of course kids don’t seem to care!

A word about food insecurity

We try to be respectful of the challenges children and families face including food insecurity. As an educator, I try to avoid using food in projects when

possible. I make exceptions for projects that may have a lot to teach kids and where I feel we won't be wasteful. That said, please think carefully about the population of students and families you serve before doing this project. Consider whether they would find this wasteful or offensive before proceeding. Also consider vegan families who may not want their children working with animal products; see some of the alternatives we suggest below.

Magic Milk Variations

- **Try Different Milk Types** We have used almond and cow's milk for this experiment and both worked well. The higher the fat content of the milk the more pronounced the "explosions" should be. A fun experiment would be to compare the results with different types of milk: almond, cow, rice, coconut. You can also experiment with cream, whole milk, and skim milk to see if there is a difference.
- **Premix the soap and milk** For a variation we premixed the milk and dish soap. You won't have the color burst effect but it does seem to keep the colors separate a little longer.

The Science Behind the Magic Milk Experiment:

The dish soap molecules are attracted to the fat molecules in the milk. As soon as you introduce the soap to the milk/coloring mixture the molecules race around trying to bond. The food coloring gets pushed around in the process and appears to burst. Eventually the molecules all bond and the reaction stops.

This is a good example of how detergents work, their molecules have two ends: one end is attracted to oils and the other to water. One end of detergent molecules attracts oils and dirt from clothes, dishes etc., and as they stick together they break the oil and dirt down into smaller, easy to remove pieces.

How to Do the Magic Milk Experiment in the Classroom

If you would like to the magic milk experiment with a class full of kids here are step-by step instructions.

Per student Materials:

- **(1) Small Plate** or other shallow dish (make sure these are waterproof)
- **(1) Large Plate** or other shallow dish
- **Tray** to put underneath

NOTE: You may also use a divided plate as pictured above.

Teacher's Materials:

- **Milk** 1.5 gallons per class of 25 students
- **Tubs** to collect dishes in afterwards

Shared Materials:

- Small bowl of **dish soap**
- **Q-tips** (Cotton swabs)
- **Cotton Balls**
- Small bottles of **liquid food coloring**

Experiment #1 Procedure:

1. Pass out per student materials. Ask students to place the small plate in the center of the table. It will be used for the second experiment. Ask students to place the large plate in the center of their tray.
2. Explain the experiment first. Tell students they will be making colorful explosions using milk and food coloring and a "magic ingredient." Tell students to use only a few drops of food coloring once it is available. Demonstrate how to carefully squeeze drops out of the food coloring bottles.
3. Teacher(s) pour a thin layer of milk in each plate.
4. Pass out the shared materials to each group of students.
5. Ask students to carefully drop several drops of food coloring in the milk around their plate. Remind them not to disturb the color.
6. When everyone has added color tell students to grab a "magic wand" AKA a Q-tip. Ask them to dip the wand into the magic ingredient (soap) but hold it to the side of the plate until everyone is ready. You can ask them if they know what the magic ingredient is.
7. Do a countdown and on the count of 3 student should dip their q-tip into one of the drops of color. Instruct students to continue dipping the q-tip into the other drops. Listen for the oohs and aahs!
8. When done the teacher should place the plates and milk in tubs to clean.

Experiment #2 Procedure:

1. Ask students to place the small plate in the center of their tray.
2. Teacher(s) pour a thin layer of milk in each small plate.
3. Ask students to carefully drop a good squeeze of three colors of food coloring near the center of their plate. Remind them not to disturb the color.
4. When everyone has added color tell students to dip a cotton ball in the soap.
5. Instruct students to place the cotton ball in the center of the plate and not move it. **See video below.** This is an exercise in restraint!

6. Watch as the color explodes out of the center of the plate/cotton ball.
7. When done the teacher should place the plates and milk in tubs to clean.